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10/573,060	03/20/2006	Alon Slapak	P-6129-US	6660

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EXAMINER
PAUL, DISLER

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NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _7/23/09_.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _7/23/09_ is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _1-31_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The applicant's amended claim (1) as "wherein the noise destructive pattern produced

by the acoustic transducer has a non\- linear relationship to the noise pattern sensed by

the acoustic sensor" has been further analyzed and rejected over (klippel, 6,005952).

Similarly, Re claim 18 as "wherein the noise destructive pattern produced by the

controller has a non-linear relationship to the noise pattern sensed by the primary_

acoustic sensor" has been similarly further analyzed and rejected over (klippel).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of
making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the
art to which it pertains, or with which it is most nearly connected, to make and use the same and shall
set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the written description requirement. The claim(s) contains subject matter

such as "\wherein the noise destructive pattern produced <u>by the acoustic transducer has</u>

<u>a non-linear </u>relationship to the noise pattern sensed by the acoustic sensor" which was

not described in the specification in such a way as to reasonably convey to one skilled

in the relevant art that the inventor(s), at the time the application was filed, had

possession of the claimed invention.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-14; 16-31 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Wan (US 5,978,489) and Wright (US 2003/0103635 A1) and Klippel et al.

(6005952).

Re claim 1, Wan disclose of the active noise control system for

controlling noise produced by a noise source, said system comprising:

an acoustic sensor to sense a noise pattern and to produce a noise

signal corresponding to the sensed noise pattern and an acoustic

transducer to produce a noise destructive pattern based on said noise

signal (fig. 1; col.1 line 40-50; col.2 line 30-60).

But, Wan fail to disclose of the specific wherein having an

estimator to produce a predicted noise signal by applying an

estimation function to said noise signal; and to produce a noise

destructive pattern based on said predicted noise signal. But, Wright

et al. disclose of a system wherein the similar concept of having the

predicted noise signal by applying an estimation function to said

noise signal; and to produce a noise destructive pattern based on said

predicted noise signal (fig.1 (102, 1-3); fig.3; par[0038-0042,0070-

0072,0080; 0083; 0085]/ parameters Ntf and fs are used in the estimate

functions). Thus, it would have been obvious for one of the ordinary

skill in the art to have modify the combination with the predicted

noise signal by applying an estimation function to said noise signal;

and to produce a noise destructive pattern based on said predicted

noise signal for purpose of cancelling noise in large area and

outdoor/unconfined locations and maximizing the sound cancellation.

The combined teaching of Wan and Wright as a whole, failed to

disclose of such wherein the noise destructive pattern produced by the

acoustic transducer has a non-linear relationship to the noise pattern

sensed by the acoustic sensor. But, Klippel disclose of a system

wherein such wherein the noise destructive pattern produced by the

acoustic transducer has a non-linear relationship to the noise pattern

sensed by the acoustic sensor (fig.3; col.4 line 45-67; col.5 line 1-

20 & line 23-55) so as to compensate for the non-linear characteristic

of the transducer and the propagation sound so as to effectively

cancel sound.

Thus, it would have been obvious for one of the ordinary skill in

the art to have modified the combination with incorporating the noise

destructive pattern produced by the acoustic transducer has a non-

linear relationship to the noise pattern sensed by the acoustic sensor

so as to compensate for the non-linear characteristic of the

transducer and the propagation sound so as to effectively cancel

sound.

Re claim 2, the system of claim 1, wherein said estimator is able

to adapt one or more parameters of said estimation function based on a

noise error at a predetermined location (fig.1-2; par [0069-0070]).

Re claim 3, the system of claim 2, wherein said noise error comprises

an anticipated destructive interference between said noise pattern and

said noise destructive pattern at said predetermined location (fig.1-

2; par [0022-3,0078])/all including error within such plane).

RE claim 4, the system of claim 2 comprising an error-sensing

microphone to sense said noise error at said predetermined location.

(see, claim 2 rejection).

Re claim 5, the system of claim 2 comprising an error evaluator to

evaluate said noise error based on said noise signal and said

predicted noise signal (fig.1-2; par [0069,0073]/update based on noise

and predict).

Re claim 6, the system of claim 5, wherein said error evaluator comprises: a speaker transfer function module to produce an estimation of said noise destructive pattern by applying a speaker transfer function to said predicted noise signal; a modulation transfer function module to produce an estimation of said noise pattern at said predetermined location by applying a modulation transfer function to said noise signal; and a subtractor to subtract the estimation of said noise destructive pattern from the estimation of said noise pattern (fig.2; par [0069,0070]).

Re claim 7, the system of claim 2, wherein said estimator is able to adapt said one or more parameters based on a predetermined criterion (par [0070]).

Re claim 8, the system of any one of claim 7, wherein said estimator is able to reduce said error value by adapting said one or more parameters (fig.1-2; wt error mic; par [0035,0069-0070]/to have error at minimum).

Re claim 9, the system of claim 8, wherein said adaptive estimator is able to minimize said error value by adapting said one or more parameters (see claim 8 rejection).

Re claim 10, the system of claim 2, with the parameters as disclosed ,

wherein said one or more parameters comprise at least one parameter

selected from the group consisting of a center parameter, an effective

radius parameter, and an intensity parameter (par [0070]/with radius

parameter).

Re claims 11, the system of claim 10, wherein said estimator is able to adapt the

estimated parameters, but, the combined teaching of Wan and Wright et al.

and Klippel et al. as a whole, fail to disclose of the specific

wherein having a center parameter based on the following equation: $c_k(n+1) = c_k(n) - \mu_c \times e(n) \times w_k \times \sum_{s=0}^{S-1} STF(s) \times f_k[n-s] \times (1 - \upsilon_k \times \sum_{i=0}^{L-1} \times (x(n-i) - c_k(i)))$ wherein

c.sub.k(n+1) denotes an adapted value of said center parameter, c.sub.k(n) denotes a

current value of said center parameter, w.sub.k denotes said intensity parameter, L

denotes a predetermined number of samples of said noise signal, STF denotes a

predetermined speaker transfer function, S denotes a predetermined speaker transfer

function frequency parameter, .mu..sub.c denotes a predetermined convergence

parameter corresponding to said center parameter, v.sub.k denotes said effective

radius parameter, e(n) denotes said noise error, f.sub.k denotes a predetermined

function, and x(n) denotes an n-th sample of said noise signal.   However, it is noted

the concept of having the above equations for defining the center parameters is simply

an obvious conversion of well known algorithm formula for defining the center

parameter so as to similarly obtain the reduction signal, thus, it would have been

obvious for one of the oridinary skill in the art to have modified the combination with

further incorporating the equation as being a center parameter based on

the following equation: c k .function. (n + 1) = c k .function. (n) - .mu. c .times. e

.function. (n) .times. w k .times. s = 0 S - 1 .times. .times. STF .function. (s) .times. f

k .function. [n - s] .times. (1 .upsilon. k .times. i = 0 L - 1 .times. .times. (x .function. (

n - i) - c k .function. (i))) for obtaining the noise reduction signal.

Similarly Re claim 12-13 with respect to radius and intensity parameters have been

analyzed and rejected with respect to claim 11.

Re claim 17, the system of claim 1, wherein said acoustic transducer

comprises a speaker (Wan, fig.1 (14)).

Re claim 14, the system of claim 1 with the estimation function,

wherein said function comprises a non-linear function (klippel, fig.3

(30); col.5 line 222-37; col.5 line 49-56).

Re claim 16, the system claim 1, wherein said acoustic sensor comprises a microphone,

and wherein the noise destructive pattern produced by the acoustic transducer has an

exponential relationship to the noise pattern sensed by the acoustic sensor (fig.3; col.5

line 10-36/such relationship to the exponential power of zero is merely same non-linear

relationship thus indeed it does have such exponential relationship).

Re claim 18, Wan disclose of the active noise control system for

controlling a noise produced by a noise source, said system

comprising: a primary acoustic sensor to sense a noise pattern and to

produce a corresponding primary noise signal ; at least one secondary

acoustic sensor to sense a residual noise pattern and to produce at

least one secondary noise signal corresponding to the residual noise

pattern sensed by said at least one secondary acoustic sensor,

respectively (fig.1 (12,16); col.2 line 45-60), wherein said secondary

acoustic sensor is separated from said noise source by a distance

larger than a distance between said primary acoustic sensor and said

noise source (col.2 line 35-55; fig.1 (12,16)/pick up by first

microphone and propagate down to be pick up by secondary sound mic

with larger distance) and a controller with an acoustic transducer to

produce a noise destructive pattern based on said primary noise signal

and said at least one secondary noise signal(fig.1 (10,14).

    But, Wan fail to disclose of the controller with specifically

being functionally associated with an acoustic transducer and a

primary estimator to produce a predicted noise signal, wherein said

controller is adapted to produce noise destructive pattern based on

said primary noise signal and said at least one secondary noise signal

and said predicted noise signal.

    But, Wright disclose of a noise active cancellation system

wherein the controller being functionally associated with an acoustic

transducer and a primary estimator to produce a predicted noise

signal, wherein said controller is adapted to produce noise

destructive pattern based on said primary noise signal and said at

least one secondary noise signal and said predicted noise signal

(fig.1 (102,1-3); fig.3; ; par [0069; 0070-0071]/ wt parameters such as Ntf and

fs partly to help estimate).

    Thus, it would have been obvious for one of the ordinary skill in

the art to have modify the combination with the controller being

functionally associated with an acoustic transducer and a primary

estimator to produce a predicted noise signal, wherein said controller

is adapted to produce noise destructive pattern based on said primary

noise on said primary noise signal and said at least one secondary

noise signal and said predicted noise signal for purpose of cancelling

noise in large area and outdoor/unconfined locations and maximizing

the sound cancellation.

    The combine teaching of Wan and Wright as a whole, fail to

disclose of wherein the noise destructive pattern produced by the

controller has a non-linear relationship to the noise pattern sensed

by the primary acoustic sensor. But, Klippel disclose of a system

wherein such concept of having the noise destructive pattern produced

by the controller has a non-linear relationship to the noise pattern

sensed by the primary acoustic sensor (fig.3; col.4 line 55-67; col.5

line 1-55/sound with microphone has non linear relationship with sound

produced by controller) so as to compensate for the non-linear

characteristic of the transducer and the propagation sound so as to

effectively cancel sound.

Thus, it would have been obvious for one of the ordinary skill in

the art to have modified the combination with incorporating the noise

destructive pattern produced by the controller has a non-linear

relationship to the noise pattern sensed by the primary acoustic

sensor so as to compensate for the non-linear characteristic of the

transducer and the propagation sound so as to effectively cancel

sound.

Re claim 19, the system of claim 18 with the controller, wherein

said primary estimator is adapted to produce a predicted primary

signal by applying a primary estimation function to said primary noise

signal (par [0070-0071; 0080,0083]/herein estimator for noise signal).

But, they fail to disclose of the further comprising at least one

secondary estimator to produce at least one predicted secondary signal

by applying at least one secondary estimation function to said at least one secondary noise signal, respectively. But, it is noted the concept of it would have been obvious for one of the ordinary skill in the art to have combined the estimator and further in combination with such a secondary estimator to produce at least one predicted secondary signal by applying at least one secondary estimation function to said at least one secondary noise signal as per designer's need for similarly maximizing the sound cancellation.

Re claim 20, the system of claim 19, wherein said primary estimator is able to iteratively adapt one or more parameters of said primary estimation function based on a noise error (fig.102 (3); par [0069-0070]).

Re claim 21, the system of claim 19, wherein said at least one secondary estimator is able to iteratively adapt one or more parameters of said at least one secondary estimation function, respectively, based on a noise error (fig.102 (5); par [0069-0070]).

Re claim 22, the system claim 19, wherein said controller is able to control said acoustic transducer based on a combination of said predicted primary signal and said at least one predicted secondary signal (fig.2, par [0069-0070]).

Re claim 23, the system of claim 22, wherein said controller is able to control said acoustic transducer based on the sum of said predicted primary signal and said at least one predicted secondary signal (see claim 22 rejection).

Re claim 24, the system claim 20, wherein said controller comprises a noise error evaluator to evaluate said noise error (fig.1-3 (3); par [0020]).

Re claim 25, the system of claim 24, wherein said noise error evaluator is able to evaluate said noise error based on said primary noise signal, said at least one secondary noise signal and said predicted primary signal(fig.3 (3)/primary, predict and secondary noise).

Re claim 26, the system of claim 25, wherein said noise error evaluator comprises: a speaker transfer function module to produce an estimation of a primary part of said noise destructive pattern corresponding to said predicted primary signal by applying a speaker transfer function to said predicted primary signal; a modulation transfer function module to produce an estimation of said noise pattern by applying a modulation transfer function to a combination of said primary noise signal and said at least one secondary noise signal; and a subtractor to subtract the estimation of the primary

part of said noise destructive pattern from the estimation of said

noise pattern (see claim 6 rejection).

Re claim 27, the system of claim 24, wherein said controller comprises

at least one residual noise evaluator to evaluate at least one

residual noise (par [0045]).

Re claim 28, the system of claim 27, wherein said at least one

residual noise evaluator is able to evaluate said residual noise based

on said noise error and said at least one predicted secondary signal,

respectively[fig.2; par [0045]/wt feedback}.

Re claim 29, the system of claim 28, wherein said residual error

evaluator comprises: a speaker transfer function module to produce an

estimation of a secondary part of said noise destructive pattern

corresponding to said predicted secondary signal by applying a speaker

transfer function to said predicted secondary signal; a subtractor to

subtract the estimation of the secondary part of said noise

destructive pattern from said noise error (fig.1 (2-3); par [0069-

0070]/wt error subtract with speaker for secondary signal).

RE claim 30, the system of claim 18, wherein at least one of said

primary acoustic sensor and said at least one secondary acoustic

sensor comprises a comprises a microphone, microphone, and wherein the

noise destructive pattern produced by the acoustic transducer has an exponential relationship to the noise pattern sensed by the primary acoustic sensor (fig.3; col.5 line 10-36/such relationship to the exponential power of zero is merely same non-linear relationship and thus indeed have such exponential relationship).

Re claim 31, the system of claim 18, wherein said acoustic transducer comprises a speaker (fig.1 (14); col.2 line 46-47).

3.   Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wan (US 5978489) and Wright (US 2003/0103635 A1) and further in view of Klippel (US 6005952) and Dance et al. (US 6,944304 B1).

Re claim 15, the system of claim 14, but, the combined teaching of Wan and Wright et al. and Klippel as a whole, never specify of wherein said non-linear function comprises a radial basis function.

But, Dance et al. disclose of a noise signal in which having such non-linear function comprises a radial basis function (col.7 line 12-30) so as to estimate clean and noise signal in reducing the impulse noise signal. Thus, it would have been obvious for one of the ordinary skills in the art to have modified the combination with incorporating the non-linear function comprises a radial basis function so as to estimate the clean and noise signal in reducing the impulse noise signal.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to DISLER PAUL whose telephone number is (571)270-

1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. P./
Examiner, Art Unit 2615

/Vivian Chin/

Supervisory Patent Examiner, Art Unit 2614